

**Montana Board of Oil and Gas Conservation
Environmental Assessment**

Operator: Vaalco Energy (USA) Inc.
Well Name/Number: Bolke 11-01H
Location: NE NE Section 11 T37N R56E
County: Sheridan, MT; Field (or Wildcat) Wildcat

Air Quality

(possible concerns)

Long drilling time: No, 25 to 35 days drilling time.

Unusually deep drilling (high horsepower rig): No, Triple derrick drilling rig to drill a single lateral horizontal Three Forks well test, 11,800' MD/7752' TVD.

Possible H₂S gas production: Yes possible H₂S gas production from Mississippian Formations.

In/near Class I air quality area: No, Class I air quality area in the area of review.

Air quality permit for flaring/venting (if productive): Yes, DEQ air quality permit required under 75-2-211.

Mitigation:

- ☒ Air quality permit (AQB review)
- ☐ Gas plants/pipelines available for sour gas
- ☐ Special equipment/procedures requirements
- ☐ Other: _____

Comments: Triple derrick drilling rig to drill a single lateral horizontal Bakken/Three Forks well test, 11,800' MD/7752' TVD. If there are existing pipelines for natural gas in the area then associated gas must be tied into gathering system or if no gathering system nearby associated gas can be flared under Board Rule 36.22.1220. No special concerns.

Water Quality

(possible concerns)

Salt/oil based mud: Yes, oil based invert drilling mud system to drill intermediate string hole and horizontal lateral. Freshwater and freshwater mud system will be used on the surface casing hole.

High water table: Possible high water table in this area.

Surface drainage leads to live water: No, closest surface waters are northeast about 3/8 of a mile, Salt Lake and a pothole pond, about 3/8 of a mile to the west from this location.

Water well contamination: No, closest water wells are about 1/4 of a mile to the southeast and about 5/8 of a mile to the southeast from this location. Depth of these water wells range from 56' to 71'. Surface hole will be drilled with freshwater and surface casing set and cemented back to surface from 1,300'.

Porous/permeable soils: Yes, sand rocky clay soils.

Class I stream drainage: No Class I stream drainages.

Mitigation:

- ☒ Lined reserve pit
- ☒ Adequate surface casing
- ☐ Berms/dykes, re-routed drainage
- ☒ Closed mud system

☒ Off-site disposal of solids/liquids (in approved facility)

☐ Other: _____

Comments: 1,300' of surface casing cemented to surface is enough surface casing to cover the Base of the Fox Hills aquifer.

Soils/Vegetation/Land Use

(possible concerns)

Stream crossings: None anticipated.

High erosion potential: No, moderate cut up to 11.2' and moderate fill, up to 10.2' required.

Loss of soil productivity: No, location will be restored after drilling, if nonproductive. If productive unused portion of drillsite will be reclaimed.

Unusually large wellsite: No, very large location for a well of this depth, 450'X500' location size required.

Damage to improvements: Slight, surface use is a cultivated field.

Conflict with existing land use/values: Slight

Mitigation

☐ Avoid improvements (topographic tolerance)

☐ Exception location requested

☒ Stockpile topsoil

☐ Stream Crossing Permit (other agency review)

☒ Reclaim unused part of wellsite if productive

☐ Special construction methods to enhance reclamation

☒ Other: Requires DEQ General Permit for Storm Water Discharge Associated with Construction Activity, under ARM 17.30.1102(28)

Comments: Using existing county road, Salt Lake Road. Will have to build about 125' of new access road into location off the existing Salt Lake gravel county road. Drilling fluids and completion fluids will be hauled to a commercial Class II disposal. Cuttings will be left in the lined reserve pit. Cuttings will be mixed with flyash or ag lime and will be buried in the lined pit after being allowed to dry. No special concerns.

Health Hazards/Noise

(possible concerns)

Proximity to public facilities/residences: Closest residence is about 1/2 of a mile to the southeast from this location.

Possibility of H₂S: Possible H₂S from Mississippian Formations.

Size of rig/length of drilling time: Small triple drilling rig 25 to 35 days drilling time.

Mitigation:

☒ Proper BOP equipment

☐ Topographic sound barriers

☐ H₂S contingency and/or evacuation plan

☐ Special equipment/procedures requirements

☐ Other: _____

Comments: Proper BOP and adequate surface casing cemented to surface should mitigate any pressure problems. (BOP's 3,000 psig annular, pipe and blind rams) rule 36.22.1014. No concerns.

Wildlife/recreation

(possible concerns)

Proximity to sensitive wildlife areas (DFWP identified): None identified.
Proximity to recreation sites: None identified.
Creation of new access to wildlife habitat: No
Conflict with game range/refuge management: No
Threatened or endangered Species: Threatened, endangered or candidate species identified are the Piping Plover and the Whooping Crane. Candidate specie is the Sprague's Pipit. NH tracker website lists fourteen (14) species of concern: Northern Short-tailed Shrew, Arctic Shrew, Baird's Sparrow, Le Conte's Sparrow, Nelson's Sparrow, Sprague's Pipit, Ferruginous Hawk, Chestnut-collared Longspur, Piping Plover, Black Tern, Sedge Wren, Bobolink, Whooping Crane and Smooth Greensnake.

Mitigation:

- ☐ Avoidance (topographic tolerance/exception)
- ☐ Other agency review (DFWP, federal agencies, DSL)
- ☐ Screening/fencing of pits, drillsite
- ☐ Other: _____

Comments: This location is on private cultivated land. There maybe species of concern that maybe impacted by this wellsite. We ask the operator to consult with the surface owner as to what he would like done, if a species of concern is discovered at this location. The Board of Oil & Gas has no jurisdiction over private surface lands.

Historical/Cultural/Paleontological

(possible concerns)

Proximity to known sites: None identified.

Mitigation

- ☐ avoidance (topographic tolerance, location exception)
- ☐ other agency review (SHPO, DSL, federal agencies)
- ☐ Other: _____

Comments: Private cultivated surface lands. There maybe possible historical/cultural/paleontological sites that maybe impacted by this wellsite. We ask the operator to consult with the surface owner as to his desires to preserve these sites or not, if they are found during construction of the wellsite. The Board of Oil & Gas has no jurisdiction over private surface lands.

Social/Economic

(possible concerns)

- ☐ Substantial effect on tax base
- ☐ Create demand for new governmental services
- ☐ Population increase or relocation

Comments: Well is a wildcat oil well. No concerns.

Remarks or Special Concerns for this site

Well is a single lateral horizontal Bakken/Three Forks well test, 11,800'MD/7752'TVD wildcat well. No concerns.

Summary: Evaluation of Impacts and Cumulative effects

No significant long term impacts expected, some short term impacts are expected.

I conclude that the approval of the subject Notice of Intent to Drill (does/**does not**) constitute a major action of state government significantly affecting the quality of the human environment, and (does/**does not**) require the preparation of an environmental impact statement.

Prepared by (BOGC): /s/Steven Sasaki
(title:) Chief Field Inspector
Date: July 27, 2012

Other Persons Contacted:

Montana Bureau of Mines and Geology, GWIC website
(Name and Agency)
Sheridan County water wells
(subject discussed)
July 27, 2012
(date)

ENDANGERED, THREATENED, PROPOSED AND CANDIDATE SPECIES
MONTANA COUNTIES, Sheridan County
(subject discussed)

July 27, 2012
(date)

Montana Natural Heritage Program Website (FWP)
(Name and Agency)
Heritage State Rank= S1, S2, S3, T37N R56E
(subject discussed)

July 27, 2012
(date)

If location was inspected before permit approval:

Inspection date: _____

Inspector: _____

Others present during inspection: _____